
Claims

The embodiments of the invention in which an exclusive property and privilege is claimed are defined as follows:

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1. A device for displaying short and long duration neutral to earth voltage events comprising:

means for sensing neutral to earth voltage in the immediate area of animals susceptible to it or be affected by it and comprising a computer oscilloscope device, a computer with either a CRT or LED monitor and a differential probe unit all connected together and forming one unit,

means for sensing neutral to earth voltage events at speeds typically at 50MS/s for single shot signals and up to 5GS/s for repetitive signals and with a high resolution of typically 12 bits or higher,

means for sensing neutral to earth voltage events on the 5 ms/division scale with a real time sampling rate greater than 100Ks/s and ideally 10MS/s or greater on this scale,

means for sensing neutral to earth voltage with trigger modes in free run with auto, repeat and single pre and post trigger $\pm 100\%$ and storing events as files on the computer and on selectable scales ranging from 5 billionths of a second per division up several seconds per division,

means for sensing neutral to earth voltage with voltage ranges $\pm 50\text{mV}$ to $\pm 20\text{V}$ in nine ranges,

means for sensing neutral to earth voltage with overload protection $\pm 100V$,

means for sensing neutral to earth voltage with input impedance of 1M ohm and with coupling AC and DC,

means for sensing neutral to earth voltage with two channels and one with external trigger,

means for differentially sensing voltage between the neutral and remote earth typically with a rise time of 14 billionths of a second and with a measurement accuracy of $\pm 2\%$,

means for sensing neutral to earth voltage differentially with an external or internal power adapter power supply of 9V DC/60mA power supply

means for securely housing the entire oscilloscope monitoring system of this invention within a locked dust and insect proof enclosure using security screws and locks.

2. A device for conveying information from claim 1 to a remote user:

means for connecting the computer system of claim 1 to a remote computer with display either CRT or LED and typically using a modem to modem, cable modem to cable modem or network card to network card or by wireless communication or fiber optics or other means of communication,

means for conveying information between the oscilloscope computer system of claim 1 to another computer or computers and not excluding existing telegraphic or wireless methods.

3. A device for enabling the oscilloscope computer system of claim 1 to function with claim 2 in a secure manner:

means for capturing, displaying and saving short and long term neutral to earth voltage events over a windows operating system and called SvScope for Windows, means for securing windows operating system disabling several windows functions thereby restricting site user access to the entire computer based oscilloscope system such that the remote expert only has complete administrator privileges over the oscilloscope system,

means for remote access connecting the device of claims 1 and 2 to a remote computer securely using an encrypted password in both real and historic time and in that an expert in a remote location may use advanced diagnosis to work out low cost methods to reduce and eliminate short and long term neutral to earth voltage.

4. A computer oscilloscope online monitoring system according to claims 1, 2 and 3 comprising:

means for connecting the device of claim 1 between any bonded neutral surfaces to a remote and a reference ground rod and typically but not exclusively using coaxial BNC connector type computer cable,

means for moving the connector cable to various locations in contact with both neutral and animal contact surfaces or in the immediate area of animals susceptible to or be affected by the neutral to earth voltage,

means for connecting a 500 Ohm electrical resistor between the differential probes of claims 1 and 4 in a manner that this connection may be opened or closed.